1970

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Recommended Citation

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FIELD DEPENDENCE IN SCHIZOPHRENIC AND NONSCHIZOPHRENIC PATIENTS

James E. DeLano, Jr.

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FIELD DEPENDENCE IN SCHIZOPHRENIC AND NONSCHIZOPHRENIC PATIENTS

A Thesis Submitted to
The Department of Psychiatry
Yale University School of Medicine
by

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B.A. Yale University, 1965

In Partial Fulfillment of the Requirements
for the Degree of Doctor of Medicine

April 1, 1970
New Haven, Connecticut

ACKNOWLEDGMENT

I wish to acknowledge with gratitude the inspiration, support, and encouragement offered by Dr. Martin Harrow and Dr. Gary Tucker during the life of this project. I wish also to extend my thanks to the patients and nursing staff of Tompkins One, without whose enthustiastic co-operation this study would not have been possible.

TABLE OF CONTENTS

PAGE

INTRODUCTION

For many years clinicians have observed phenomena in schizophrenic patients which could be attributed to alterations in their mechanism of perception. Hallucinations, which may be considered perceptual experienes occurring in the absence of an external stimulus, are among the most striking of such phenomena.

Within the last two decades, increased emphasis on alterations in perception in schizophrenia other than hallucinations has appeared in the theoretical and experimental literature. Some workers have, on the basis of interviews with, and autobiographical accounts by, schizophrenic patients, postulated that perceptual changes are an integral part of the clinical entity. Others have felt that a perceptual disturbance might reflect a general disruption in mechanisms of thought, and have found that perceptual measures lend themselves well to quantifiable study.

This introduction will review studies representative of both schools of thought, and so provide a perspective in which to discuss the concept of field dependence. Briefly defined, a field dependent perceptual style is one dominated by the overall organization of the perceived field, whereas a field independent style implies perception of the elements of the field as separate and discrete. The theoretical relevance of this concept for the study of

schizophrenia will be discussed, and experimental questions raised.

Etiological Role of Perceptual Changes

The theory advanced by Hoffer and Osmond (1) postulates an alteration in perception as totally responsible for the clinical picture of schizophrenia. According to their formulation, a biochemical disorder disturbs areas of the brain which integrate, stabilize, and maintain constancy of sensory perception. As a consequence of this change in his experience of the world, the schizophrenic changes his behavior and personality. This is most clearly seen in the case of the paranoid patient, who acts on the basis of the (mistaken) perception that he is being watched by other people (2). They base their formulation on a) autobiographical accounts by schizophrenics, b) the similarity of clinical states produced by the hallucinogenic (and therefore perceptually altering) drugs and by schizophrenia, and finally, c) the ability, through post-hypnotically induced changes in perception, to produce the symptoms of schizophrenia. Although these workers have not defined a biochemical disorder selectively disturbing perception, they feel that correction of such a metabolic error would be sufficient to cure the schizophrenic patient.

Distraction and Perception

McGhie and Chapman (3,4) working with interview data from twenty-six early schizophrenic patients, have formulated the hypothesis that the primary disorder in schizophrenia is a decrease in the selective and inhibitory functions of attention. As a consequence, there is reversion to a primitive level of perceptual functioning, a diffuseness of sensory channels, loss of motor spontaneity, decrease in ability to concentrate, and a progressive thought disorder arising from the inability to think logically. These workers subsequently (5) subjected thirty-six patients (twenty-three ill for more than five years) to tests of audio and visual distractibility, and found that their ability to attend to visual information was affected by an audio distraction to a significantly greater degree than that of controls or nonschizophrenic patients. In their experiments, chronic schizophrenic patients were not significantly more distractible than relatively acute schizophrenics.

Perceptual Experience Inventory

Harrow and Tucker (6) have attempted to study perceptual non-hallucinatory experiences of schizophrenic and nonschizophrenic patients in a systematic manner. Fourteen statements about unusual perceptual experiences (culled

primarily from the interviews by McGhie and Chapman) were presented in a questionnaire to seventy-three acute schizophrenic and nonschizophrenic patients. The schizophrenics reported experiencing these phenomena slightly, but not significantly, more frequently than did the nonschizophrenic patients. The most highly correlated variable was found to be the trait of anxiety. The reporting of these experiences by both schizophrenic and nonschizophrenic patients speaks against a necessary and sufficient etiological role for a perceptual disorder in schizophrenia.

Psychological Tests of Perception

A number of quantifiable measures of perceptual function have been developed in recent years, and several of these tests have been administered to schizophrenics. One of these measures is size constancy, defined by Weckowicz as "the ability to accurately judge equality of size of two objects at different distances from the subject." (7) Employing this test, Weckowicz found that schizophrenics as a group had poorer size constancy than normals, although paranoid schizophrenics were found to have greater size constancy than normals. Weckowicz and Blewett (8) extended this work, and found a positive correlation between poor size constancy and impaired ability for abstract thinking (as measured by a battery of tests) in schizophrenic pat-

ients. This correlation was felt to support their hypothesis that the defect in schizophrenia is the inability to "select...some information according to certain principles and suppress all other information." (8) This defect is essentially cognitive in nature, but will be manifest in the perceptual process in the inability to perceive stable things or objects when there is a change in sensory input. Weckowicz and others (9) have also studied distance constnacy in schizophrenic patients, and find results consistent with the size constancy data.

Stannard et al (10) also tested size constancy in schizophrenic patients and normal volunteers, but in some trials provided informational feedback to the subjects as to the accuracy of their performance. With feedback, the schizophrenics improved their performance to the level of the normal population, whereas normal subjects did not improve their scores with feedback. This data was felt to be consistent with the hypothesis that differences in schizophrenic performance were attributable to motivational or instructional aspects of the procedure, and not to perceptual differences.

Bemporad (11) hypothesized that a reversion to part perception, as distinguished from whole perception, is integral to schizophrenia. On the assumption that the ability to give the correct (number) response to difficult Ishihara

(color-blindness test) cards requires intact whole perception, and that incorrect number or no response would indicate part perception only, he found that part perception predominated in acute schizophrenic patients, but diminished with chronicity, although never attaining the level of whole perception found in controls.

The concept of perceptual closure, which is closely related to whole perception, can be defined as the tendency to complete what is incompletely presented in the visual field in order that as "good" or complete a figure as possible be perceived. Snyder (12) studied perceptual closure in chronic schizophrenics, acute paranoid schizophrenics, and controls by means of the Taylor test. This test requires the subject to reproduce a figure containing several open lines, and the degree of closure is the extent to which the gaps are closed in the reproduction. Chronic schizophrenics had significantly lower closure scores than normals, while acute paranoid schizophrenics had a significantly higher degree of closure. These results were interpreted as indicating that chronicity in schizophrenia involves a deterioration of the normal tendency to re-organize the perceived environment, whereas the internal emotional turmoil of the pre-psychotic states leads to excessive manipulation of the perceived.

Silverman Attention Model

Julian Silverman, in extensive writings (13,14,15,16), has attempted formulation of an "attention" model of schizophrenia. In an early paper (13) attention was described in terms of two "cognitive control principles". The first, the scanning control, was derived largely from the work of Piaget (17), and denotes the extent to which stimuli are sampled from the sensory or perceptual environment. The second, the field articulation principle, derived in large part from the work of Witkin (discussed below), is concerned with the manner in which stimuli are selected from the stimulus field. An individual's attention-response dispositions, described in terms of the cognitive control principles, are felt by Silverman to determine in part the defense mechanisms which will be utilized by that individual in the mastery of anxiety.

In a later paper (16) Silverman adds the concept of stimulus intensity control, which determines not only the threshold of response to stimuli, but also the manner in which stimuli are "modulated"; that is, augmented or reduced. Much of the evidence in support of this last concept is derived from the work of Petrie (18).

The attention model is an attempt to order into a coherent whole experimental results obtained with schizophrenic patients which on first inspection appear contradictory.

Silverman emphasizes the importance of sub-type groupings within schizophrenia, particularly such dichotomies as process-reactive and acute-chronic, as well as the traditional diagnostic categories. In particular, Silverman sees a high correlation between a poorly differentiated field-articulation response pattern and the process sub-type, with a highly articulated pattern characteristic of reactive schizophrenics. The paranoid sub-type is associated with extensive scanning and a high degree of field articulation, whereas catatonics, hebephrenics, and simple schizophrenics show minimal scanning and undifferentiated field articulation. Stimulus intensity reduction is pronounced in nonparanoid, chronic, poor-premorbid schizophrenics, while non-reduction or augmentation is seen in paranoid schizophrenics.

To the extent that the perceptual response dispositions seen in schizophrenics represent extreme forms of tendencies seen in normal individuals, the model is general, and not merely descriptive of the pathological. Thus the cognitive control principles are relevant to the study of personality generally, and to the study of the defenses particularly.

Two final points must be made with regard to the Silverman attention model which are particularly relevant to the study of acute schizophrenic patients. First, "a moderate or non-extreme attention deployment response pattern in schizophrenia is associated with a good prognosis", and

second, "long-term involvement in the schizophrenic resolution appears to be associated with change in attention response style." (13)

Witkins's Theory of Psychological Differentiation

H.A. Witkin and others (19,20) began in the late 1940's to study personality through perceptual variables. Working initially with normal college students, they found that in a series of tests requiring the subject to orient himself or some aspect of his environment to a true vertical position in the face of misleading cues, their subjects generally showed consistent ability or disability from one test to the next. These high correlations of performance were felt to be best explained by the tendency, among those subjects with a high degree of accuracy in vertical positioning, to attend selectively to useful bodily cues, and to disregrad irrelevant and confusing visual cues. This concept of selective attention was broadened and termed "field independence", and received support when individuals with this "field independent perceptual style" were found to do well on a different type of test (the Embedded Figures Test) which required the subjects to pick out a simple design which was hidden (embedded) in a more complex design. It should be noted that scores on all the tests were continuously distributed, with relatively few individuals at either extreme. Correlations between the var-

ious tests were found to be in the range r = 0.70 to r = 0.90. (19) Men were consistently found to have a significantly more field independent perceptual style than women. Short-term stability of the style was shown by test-retest correlations of r = 0.90 or higher in most series.

Broader implications of the concept of perceptual style were postulated by Witkin and his co-workers (19) from the correlation between personality variables (derived from analysis of structured interviews) and field independence/dependence indices (derived from scores on several perceptual tests). Field independent persons were found to have a high degree of self-awareness, to express impulses directly, to be active, to deal with feelings of inferiority compensatority, and to show self-assurance. Field dependent persons, on the other hand, were seen as lacking insight, repressing impulses, passive, yielding to inferiority feelings, and as tense and anxious. It must be stressed that these are not absolute typologies. The clearest relationship between perceptual style and personality was seen at the extremes; that is, in field independent men and field dependent women.

Longitudinal and cross-sectional studies of perceptual style through the first two decades of life have shown a clear tendency for increasing field independence during this time in the development of the individual (20). This trend,

correlated with increasing autonomy during this period, has lead to the elaboration of the concept of "psychological differentiation", which can be described in terms of not only perceptual style, but also body concept (the sense of boundaries of the body and of the inter-relations among its parts), sense of separate identity, and the nature of psychological defenses. Psychological differenatiation may be defined as "an underlying process of development toward greater psychological complexity." (21) With regard to level of differentiation and the use of defenses, it has been shown that highly differentiated persons use specialized defenses, such as isolation, whereas poorly differentiated individuals tend to use defenses such as massive repression and primitive denial.

The claim that a construct, such as perceptual style, reflects certain aspects of personality implies that such a measure has relative stability over time. As mentioned above, in a short-term situation, test-retest correlations are high. The changes which occur in perceptual style over the first two decades of life may be attritubed to the change inherent in the development of personality. As yet, however, there is no evidence from longitudinal studies relevant to the intra-individual stability of perceptual style. Schwartz and Karp (22) in a cross-sectional study determined field independence in normal subjects aged 17, 30 to 39, and 58 to 82. They

found a tendency for field dependence to increase with age after the second decade, and also for sex differences to become less marked with age. These results were seen as reflecting the less self-reliant mode of functioning appropriate to old age, and the diminishing extent of sexual differentiation. Quantitatively, the oldest group did not revert to the level of field dependence found in young children. Karp (23) offered further evidence for an association between perceptual style and autonomy/dependence in the aged when he showed that retired males, in the range 60 to 75, were more field dependent than working males of the same age group.

Other evidence for the stability of perceptual style has been presented by Karp, Witkin, and Goodenough (24,25) in work with alcoholics. They showed that on both a short-term and a long-term (15 months) basis ingestion of alcohol did not change the field dependence scores of alcoholics. This work is of particular significance in that earlier studies (20) had shown alcoholics to be consistently more field dependent than normal controls matched for age and sex. The implication can thus be drawn that a perceptual style, field dependence, reflecting a poor level of psychological differentiation, is associated with a personality pattern predisposed to (or, less likely, resulting from) alcoholism. Other means of experimental intervention, quoted by Witkin (21) which have not been effective in changing perceptual style are:

drug administration, electroconvulsive shock, stress due to anticipated heart surgery, special training, hypnosis, or important changes in life circumstances. However, a challenge to the hypothesis of stability of perceptual style has been advanced by Jacobson (26,27). He showed, using as subjects both normal college students and chronic alcoholics, that a brief period of audio and visual sensory deprivation was associated with a significant increase in degree of field independence on the rod and frame test.

In discussing the implications of the theory of psychological differentation for the study of pathology, Witkin (21) first points out the relationship between differentiation, defined as specialization of function, and integration. Integration refers to the relations between parts of a psychological system, and to the interaction between that system and its surroundings. A high level of integration implies a great degree of differentiation. Adjustment is primarily a function of integration, which in turn is influenced by the degree of differentiation. Mal-adjustment, which may be considered the external manisfestation of pathology, will result from impairment or disruption of integration, and will be influenced by the level of psychological differentiation. Disturbance in a poorly differentiated individual (one with a global cognitive style) may lead to problems of identity, passivity, and helplessness. As mentioned above, alcoholism is associated with poor differentiation, as are

ulcers, obesity, and asthma. Highly differentiated individuals, when breaking down under stress, tend to be delusional, outwardly aggressive, and to show a continuing struggle to maintain identity. Paranoids and obsessive-compulsive characters both tend to have articulated, field independent cognitive styles.

Specific symptoms will be influenced by the level of differentiation. Thus, Witkin (21) cites Taylor's (unpublished) work showing that psychotics who hallucinate were more field dependent than delusional psychotics. In Witkin's model, hallucinations are seen to result from the dissolution of ego boundaries, whereas delusions are seen as attempts to maintain the integrity of the ego.

To date there have been few studies of field dependence in schizophrenic patients, and those studies which have been done generally have involved chronic patients. Witkin's work (19) showed no association between the diagnosis of schizophrenia and level of differentiation, but when schizophrenics as a whole were divided into paranoid and nonparanoid sub-groups, the latter was significantly more field dependent. Similar results were found by Janucci (unpublished, cited by Witkin (21)). Division along the process-reactive dimension, with process schizophrenics more field dependent than reactives, has been found by Bryant, but not confirmed by Cancro (both unpublished, cited by Witkin (21)). Later work by Sugarman

and Cancro (28) found a complex relationship between field dependence and the process-reactive dimension, with process patients showing extreme field independent or dependent scores, and reactive patients having intermediate scores.

Weckowicz (29), using a hidden-figure test similar to the embedded figures test of Witkin, found that schizophrenic and organic patients had poorer scores (i.e., were more field dependent) than non-schizophrenic patients or normals. However, he did not specify any further clinical data about his patients.

A final question suggested by Witkin's theory of differentiation is whether, under conditions of psychological stress, differentiation in different areas is maintained at similar levels. Sugarman and Cancro (30) have shown that field independence, as measured by the rod and frame test, and sophistication of body concept, as measured by the figure drawing test, remain correlated in the same direction in acutely hospitalized schizophrenics as in normals.

Theoretical Summary

Some investigators have found consistent differences on perceptual tests between schizophrenic patients and nonschizophrenic patients or normal controls. Silverman, collating a large amount of experimental evidence, has formulated a model of attention which is based on three "cognitive control prin-

ciples". He has reconciled much of the apparently contradictory evidence derived from perceptual experiments with schizophrenics by emphasizing the classical heterogeneity of the disorder, as well as some recently emphasized dichotomies within it. One of Silverman's cognitive control principles, the field articulation control, is derived in part from Witkin's theory of psychological differentiation, one expression of which is the "cognitive style" characteristic of the individual's relationship to his environment. The perceptual style of the individual, stated in terms of his field independence, is a measurable expression of his cognitive style. Although Witkin would claim no simple relationship between the level of psychological differentiation and the form of pathology, to the extent that differentiation will influence the nature of the symptoms formed in an individual subjected to stress, certain sub-groups within schizophrenia (acute-chronic, paranoid-nonparanoid, process-reactive) may show characteristic degress of field independence.

Experimental Questions

1. To what extent can the construct of perceptual style be applied in the study of hospitalized schizophrenic and nonschizophrenic patients?

2. Will schizophrenics, in the acute phase of their

disease, be more field independent than similarly acute nonschizophrenic patients?

3. Will schizophrenic and nonschizophrenic patients show similar or different patterns of change in perceptual style over two months of hospitalization?

4. To what extent, if any, does a change in perceptual functioning accompany acute schizophrenia?

METHODS

Patient Sample

The patient sample consisted of 71 consecutive admissions to the acute in-patient psychiatric ward of Yale-New Haven Hospital. This unit, known as Tompkins One, has been described by Detre et al (31) and Astrachan et al (32). The primary theraputic emphasis is upon active and responsible participation in small therapy groups, the ward community, and the family. First and second year residents serve as primary therapists. The ward is an integral part of the teaching programs for medical and nursing students. Demographic characteristics of the patient population are set forth in Table 1, and the breakdown of the sample by diagnosis in Table 2. Diagnoses were arrived at jointly by a psychologist, with eight years of experience, and a psychiatrist with five years of experience, and were based on the findings at admission, review of the hospital course, and the raters' observations of the patient. Any data obtained by diagnostic psychological testing was excluded in the formulation of the diagnosis. Clinical judgments as to position on process-reactive and paranoid-nonparanoid continua were also made for the schizophrenic patients.

Participation in experimental protocols is a condition of acceptance to the ward. Thus, in addition to the measures described below, other psychological tests, including portions

Table 1. Demographic Characteristics of the Patient Sample

	Schizophrenic	Nonschizophrenic	Total
Number	35	36	71
Sex			
Men	11	14	25
Women	24	22	46
Age (mean)	22.5	35.1	
Distribution			
10-20	20	12	32
21-30	10	2	12
31-40	3	8	11
41-50	1	5	6
51-60	0	6	6
61 and older	1	3	4
Educational Level			
Post Grad. Degree	2	6	8
College Graduate	4	8	12
Some College	7	3	10
High School Grad.	6	7	13
Some High School	15	11	26
Not known	1	1	2
WAIS Information(29 max.)	20.0	19.5	

Table 2. Diagnoses of the Patient Sample

Diagnosis		Number	Per cent
Schizophrenic		35	49
Pseudoneurotic or Borderline	16		
Acute undifferentiated	11		
Schizoaffective	1		
Paranoid	3		
Chronic undifferentiated	4		
Nonschizophrenic		36	51
Seizure disorder	1		
Anorexia nervosa	1		
Character disorder	12		
Neurotic depression	8		
Psychotic depression	7		
Manic-depressive, manic	1		
Organic brain syndrome	2		
Addiction	4		

of the Wechsler Adult Intelligence Scale, were established parts of the ward routine.

Rod and Frame Test (RFT)

The rod and frame test administered was a modified version of that described by Witkin (19). In this test, the sub-

ject sees a luminiscent rod surrounded by a luminescent square frame. The test is administered under conditions of complete darkness in the test room, so that nothing is visible to the subject except the rod and frame. The task is to align the rod to the true vertical, using a remote-control switch which governs an electric motor attached to the rod. By definition, field dependent persons will be influenced in their judgments about true vertical by the position of the frame, which is tilted to either side on various trials. Field independent persons, on the other hand, will be able to suppress or reject the spurious cues offered by the tilted frame, and will therefore set the rod closer to true vertical.

The apparatus used was that manufactured by the Marietta Apparatus Company, Marietta, Ohio. As supplied by the manufacturer, this apparatus (Model 1810) utilizes an ultraviolet light to excite fluorescent paint on the rod and frame. Because of the large amount of visible light emitted by this U-V source, this arrangement was found unsatisfactory. As an alternative means of illumination, luminescent paint, which glowed brightly for several hours after brief exposure to a bright light, was applied to the rod and frame, and this modification proved most satisfactory.

The apparatus consists of 1 inch diameter metal tubing, bent into a square 42½ inches on each side, mounted on a black wooden disc. The disc can be freely rotated about its

central axial mounting. The rod, also 1 inch metal tubing, 40½ inches long, is mounted on a shaft which passes through the center of the disc mounting. The shaft is linked to a bi-directional electric motor, with dual controls, so that the position of the rod can be controlled by both the experimenter and subject. A protractor and two pointers, illuminated by low-intensity red lights, allow the experimenter to determine, readily and accurately, the relative positions of rod, frame, and true vertical. The apparatus is pictured in Appendix I.

The test was conducted in a rectangular room 9 feet wide by 14 feet long. The walls of the room were painted flat black, and the floor and ceiling concealed by black cloth drapes. The subject was seated on a 14 inch diameter backless stool, 17 inches high, which was placed 10 feet from, and directly in front of, the apparatus. A nurse chaperon was present during the testing of all female patients.

Protocol of the test: The subject was escorted into the lighted experimental room, instructed to sit on the stool, and given the remote-control switch. The lights were then extinguished, and the experimenter took his position behind the apparatus. The following instructions were then given:

> This is a test of perception. I am going to give you the instruction to close your eyes while I make adjustments to the apparatus you see in front of you. I will then give you the instruction to open your eyes, and

> at that time I want you, by using the control switch you have, to place the rod in a vertical position; that is, straight up and down, in the direction of gravity. You may now try the switch by pushing it to one side, and noting how the rod moves. (The subject would then move the rod.) Now push the switch to the other side, and note that the rod moves in the other direction. (The subject would then move the rod in the opposite direction.) In each case, as soon as you have put the rod in a vertical position, let me know, so we can go on to the next trial. Do you have any questions?

Questions similar to, "Do you want me to put the rod in line with the frame?" were answered by repeating the instruction "You are to place the rod in a vertical position; that is, straight up and down, in the direction of gravity." When all questions had been answered, the subject was instructed to close his eyes. The time elapsed from the instruction "Open your eyes and begin" to the subject's indication that the rod was vertical was recorded for each trial.

The experiment consisted of 15 trials, with the frame set to vertical, 10 degrees, or 30 degrees to either side. The rod was placed either vertically, or 15 degrees to either side. The trials were run in a standard random order. The subjects were given no information as to the accuracy of their performance. A copy of the scoring sheet, with the list of apparatus settings for the trials, is included as Appendix II.

For the purpose of scoring, only twelve trials were considered. The three trials in which the frame was in an upright position were included solely as a means of conveying

information to the subjects about the nature of the task. An error to either side of the true vertical when the frame is upright has no theoretical significance in terms of field dependence.

Scores were calculated in two ways. First, the average absolute error from true vertical, in degrees, was calculated for the twelve trials. The second method of scoring involved the fixing of sign to the errors. If an error were on the side of vertical toward the direction of frame tilt, it was considered a positive error. An error in the direction opposite to frame tilt was given a negative sign. The score calculated by the second method was the arithmetical sum of signed errors, in degrees, divided by twelve. Persons who were field dependent would have large errors, all positive in sign. Relatively field independent persons would have small errors, and as they would tend to be both positive and negative in sign, they would tend to cancel out. The second system would thus exaggerate the difference between field dependent and independent persons. In both systems, field dependent persons have high scores, and field independent persons have low scores.

The rod and frame test, under the conditions described, was administered to 70 out of 71 consecutive admissions. The exception was a paraplegic patient confined to a wheelchair

who would have been unable to maintain his balance on the stool. In 87 per cent of cases, administration was done within eight days after admission. In two cases, clinical considerations precluded testing for 11 and 18 days after admission; in the other seven cases, schedule conflicts delayed testing, but in no instance was the administration delayed more than 11 days after admission.

The second administration, under identical conditions, was carried out during the eighth week of hospitalization. A total of 46 patients were tested the second time. One patient was so suicidal that she was not allowed to leave the ward for testing, and the remainder of patients had been transferred or discharged.

Embedded Figures Test (EFT)

The Jackson (33) modification of Witkin's embedded figures test was administered to 49 of the 71 admissions. The other patients were not tested on this measure because the method of administration was not formulated until about two months after the RFT testing had begun.

The EFT consists of twelve designs, eleven of which are colored, in each of which is hidden one of six different simple figures. The object of the test is to find the simple design, and point it out to the examiner, in the shortest time possible.

The following test procedure was used. The subject was allowed to study the complex figure for 20 seconds, and then, with the complex figure covered, to study the simple figure for 15 seconds. The simple figure was then again covered, and the time measured from the moment the complex design was again uncovered. The subject was allowed to refer back to the simple figure at will, and the stop watch was stopped during such periods of reference, but he was at no time allowed to see both figures simultaneously. The score recorded for each trial was the number of seconds elapsed, less the time spent in referring to the simple figure, before the subject completed tracing the hidden figure in the complex design. If the subject failed to find the hidden figure in three minutes, a score of 180 was recorded, and the next trial begun. Because of the high degree of frustration invariably accompanying repeated failure, subjects who were unsuccessful in finding the hidden figure in the first six trials were not tested further, and an average score of 180 recorded. Two schizophrenic and one nonschizophrenic patient failed to complete the test.

On this test, field independent persons will be able to separate out the relevant aspects of the figure, and will disregard the confusing cues offered by the design as a whole. Thus, they will find the hidden figures rapidly, and will have low mean scores. Field dependent persons, on the other hand,

will be unable to separate the hidden figures from the whole of the design, and will have high mean scores.

Statistical analysis was carried out using standard techniques. Values of "p" less than, or equal to, 0.05 were considered significant.

RESULTS

The first consideration which arises in analysis of the data is the choice of scoring system for the rod and frame test. As was described in the section on methods, the mean error per trial was calculated first from the sum of the absolute errors, and then from the sum of signed errors, with errors opposite to the direction of frame tilt being given negative value. The advantage conferred by the second system, smaller mean errors for field independent persons, is offset by the disadvantage of possible negative scores. In this study negative mean error scores were observed in five instances; in three cases, they represented over-compensation by extremely field independent persons, whereas in the other two cases they resulted from extremely erratic performance on the test. The correlation between the sets of values derived from the two systems, excluding the negative scores, was $r = 0.99$ for the data as a whole, and $r = 0.93$ and $r = 0.92$ for the nonschizophrenic and schizophrenic patients, respectively. In light of this extremely high correlation, and the fact that virtually all other field dependence data reported in the literature is based on the first (absolute error) system of calculation, this system was used for the calculation of all results presented.

Validation of the Construct

The extent to which the data collected in this study reflect measurement of the construct "perceptual style" will be indicated by the degree of correlation between the tests utilized to measure field dependence. Table 3 shows a high degree of correlation, comparable to that found by Witkin(19), between the rod and frame test at the first week (RFT_1) and the embedded figures test (EFT), not only for the group as a whole, but also for the schizophrenic and nonschizophrenic patient groups considered separately.

Table 3. Correlation between EFT and RFT_1 by Diagnostic Group

Diagnosis	Number	Correlation	Significance	Difference
Nonschizophrenic	25	$r = 0.61$	$.001 > p$	N.S.*
Schizophrenic	23	$r = 0.51$	$.02 > p$	
All Patients	48	$r = 0.68$	$.001 > p$	

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* Correlation coefficients not significantly different when tested by "z" transformation.

The correlation between the two measures (RFT_1 and EFT) was also calculated for the male and female groups separately, and was found to be $r = 0.48$ and $r = 0.56$, respectively. (Table 4.) This latter value is of particular interest in

Table 4. Correlation between EFT and RFT_1 by Sex

Sex	Number	Correlation	Significance	Difference
Males	17	$r = 0.48$	$.05 > p > .02$	N.S.
Females	31	$r = 0.56$	$.001 > p$	

---

that Witkin's original data (19) showed a correlation of $r = 0.21$ between these two measures in women. On the basis of this low correlation, Thornton and Barrett (34) have challenged the use of the EFT as a measure of field dependence in women.

These correlations are consistent with the assumption that the construct "perceptual style" is valid for this patient sample.

Correlations between Field Dependence and Demographic Data

Consistent correlations have been found by Witkin (19, 20) between several demographic variables and degree of field dependence. The mean RFT_1 and EFT scores for the patient sample, by sex, are found in Table 5, and show male patients to be more field independent on both measures. This tendency for males to have a more differentiated level of psychological functioning than females has been shown to exist at all age levels.

Table 5. Mean RFT_1 and EFT Scores by Sex

Sex	Number	RFT_1 (mean)	Number	EFT (mean)
Males				
Nonschizophrenic	14	6.1	10	71.8
Schizophrenic	10	3.3	8	72.9
All Males	24	4.9	18	72.3
Females				
Nonschizophrenic	22	8.7	15	92.7
Schizophrenic	24	6.4	16	113.0
All Females	46	7.5	31	103.1

Table 6. Correlation between RFT_1 and Age

Diagnosis	Number	Correlation	Significance	Difference
Nonschizophrenic	36	$r = 0.38$	$.02 = p$	N.S.
Schizophrenic	34	$r = 0.44$	$.02 > p$	
All Patients	70	$r = 0.42$	$.001 > p$	

Table 6 shows the correlation between scores on the RFT_1 and age, and Table 7 shows the analogous correlation for the EFT. In both cases, increasing age is seen to be associated with increasing field dependence, not only for the

Table 7. Correlation between EFT and Age

Diagnosis	Number	Correlation	Significance	Difference
Nonschizophrenic	25	$r = 0.53$	$.01 > p$	N.S.
Schizophrenic	24	$r = 0.40$	$.05 > p$	
All Patients	49	$r = 0.36$	$.01 > p$	

patient group as a whole, but also for the schizophrenic and nonschizophrenic diagnostic groups considered separately.

Table 8. Correlation between RFT_1 and WAIS Information Scores

Diagnosis	Number	Correlation	Significance	Difference
Nonschizophrenic	24	$r = +0.01$	N.S.	$.10 > p > .05$
Schizophrenic	26	$r = -0.48$	$.02 > p > .01$	
All Patients	50	$r = -0.21$	$.10 > p > .05$	

Table 9. Correlation between EFT and WAIS Information Scores

Diagnosis	Number	Correlation	Significance	Difference
Nonschizophrenic	17	$r = -0.18$	N.S.	N.S.
Schizophrenic	19	$r = -0.56$	$.02 > p > .01$	
All Patients	36	$r = -0.38$	$.05 > p > .02$	

Table 8 shows the correlation between intelligence, as measured by the Information Scale of the Wechsler Adult Intelligence Scale (WAIS) and RFT_1 scores. Table 9 shows the corresponding correlations for the EFT scores. As marked field independence is expressed by low numberical scores on both the RFT and EFT, and high intelligence is expressed by a high score on the WAIS, the expected correlation between these two traits will be seen as a negative correlation. The correlation for the nonschizophrenic group was not significant for either test, and the correlation for the patient sample as a whole was not statistically significant for the RFT_1 scores.

On the demographic variables of sex, age, and intelligence, the patient sample showed correlations consistent with those reported by other workers, and this lends further support to the assumption that the construct of perceptual style can be applied to this population.

Scores by Diagnostic Group

The scores for the patient sample, broken down into schizophrenic and nonschizophrenic groups, and also into major sub-groups within these two categories, are shown in Table 10. It should be noted that the mean score on the RFT at the first week has been calculated for both the total patient groups, and separately for the group of patients

Table 10. RFT_1 and EFT Scores by Diagnostic Group

A. All Patients

Diagnosis	Number	RFT_1 (mean)	Standard Dev.	EFT
Nonschizophrenic	36	7.7	1.2	84.4
Schizophrenic	34	5.5	4.9	99.5

B. Only Patients with RFT_8 Scores Also

Diagnosis	Number	RFT_1 (mean)	S.D.	Age(mean)	EFT
Nonschizophrenic	23	7.9	6.5		
Psychotic Depr.	5	9.5		46.6	
Neurotic Depr.	6	9.9		44.3	
Charac. Disorder	12	5.9		22.2	
Schizophrenic	23	4.4	3.8		
Borderline	12	3.8		22.4	69.4
Nonborderline	11	4.8		22.5	124.9

tested on the RFT at the eighth week also. It is interesting to note that this latter group, with longer hospitalization and therefore possibly greater symptomology, differs from the patient sample as a whole in several respects. First, the whole group of nonschizophrenics tested on RFT_1 had much less variability than the whole group of schizophrenics, but when

the patients tested both times are considered, the nonschizophrenics show the greater variability. It should also be noted that while on the RFT the schizophrenics would appear to be more field independent, on the EFT the opposite relation holds. The implications of this inconsistency will be discussed in the discussion below. Finally, the table shows that borderline and nonborderline schizophrenics differ markedly in their performance on the EFT. The field independent scores of the borderline group are consistent with the clinical impression that these patients are less disorganized and less psychotic than the nonborderline group.

Change in Field Dependence with Time

The degree of stability of field dependence can be ascertained from examination of the correlation between the RFT_1 scores and the RFT_8 scores, and this data is shown in Table 11.

Table 11. Correlation between RFT_1 and RFT_8 Scores.

Diagnosis	Number	Correlation	Significance	Difference
Nonschizophrenic	23	$r = 0.76$	$.001 > p$	$.01 > p$
Schizophrenic	23	$r = 0.95$	$.001 > p$	
All Patients	46	$r = 0.81$	$.001 > p$	

When compared to the short-term intra-individual stability of field dependence measures reported by Witkin (19), which are in the range of $r = 0.90$, the patient sample as a whole is relatively similar to a normal population. It should be noted, however, that the two patient groups showed a significant difference in stability over the two month period. The possible theoretical implications of this difference will be discussed below.

In addition to the stability of the measure, the direction and degree of observed change must be observed. The comparison between RFT_1 and RFT_8 scores can be made in three ways. Table 12 shows the comparison by means of the ratios found by dividing the RFT_8 score for each patient by his RFT_1 score. By this method, all diagnostic groups and subgroups appear to become more field dependent over the eight week period.

A second method of calculating the amount of change is to compare the mean error scores on the RFT for each diagnostic group at the two time periods. Table 13 illustrates the change in this fashion, and shows that while the non-schizophrenic group tended to become more field independent, there was no apparent change in the schizophrenic patient group as a whole. Within the schizophrenic group, the borderline patients appear to remain stable, whereas the non-borderline patients become more field dependent.

Table 12. Change Ratios (RFT_8/RFT_1) by Diagnosis

Diagnosis	Number		Ratio*
Nonschizophrenic		23	1.09
Schizophrenic		23	1.22
Borderline	12		1.05
Nonborderline	11		1.42

---

*A ratio greater than 1.00 indicates greater field dependence at the second testing.

Table 13. Change in Mean RFT Error Scores by Diagnosis

Diagnosis	Number		Mean Error		
			RFT_1	RFT_8	Change*
Nonschizophrenic		23	7.9	5.8	- 2.1
Schizophrenic		23	4.4	4.4	0
Borderline	12		3.8	3.7	- 0.1
Nonborderline	11		4.8	5.1	+ 0.3

---

*Change in the positive direction means greater field dependence at the second testing.

A final way to examine the change in scores, which takes into account the magnitude as well as the direction of change, is illustrated in Table 14. Here the magnitude of change, in degrees, is calculated for the two diagnostic groups separately. The division of the schizophrenic patients

Table 14. Mean Change in Error by Diagnosis

Diagnosis	Number			Mean Change	Change for Group
	BL.	NonBL.	Total		
Schizophrenics					
Increased F.D.	7	3	10	1.1	+ 11.0
Decreased F.D.	5	7	12	0.9	- 10.9
No Change	0	1	1	0	0
					Sum + 0.1
Nonschizophrenics					
Increased F.D.			9	0.7	+ 6.3
Decreased F.D.			13	4.3	- 55.9
No Change			1		0
					Sum - 49.1

BL = Borderline F.D. = Field Dependence

into sub-groups, of almost equal size, changing almost equal amounts in opposite directions, and so canceling each other, is in clear contrast to the marked trend among the nonschizophrenic patients toward increased field independence.

Taken as a whole, these measures would indicate that the schizophrenic patients do not change in a consistent direction over this time period, whereas there is a definite tendency for the nonschizophrenic patients to become more field independent.

Paranoia

The critical relationship, in Silverman's theoretical model, between paranoia and an articulated cognitive style, makes consideration of any such association in the data imperative. Unfortunately, only five of the thirty-five schizophrenic patients in the sample were considered paranoid on clinical grounds. Two of these patients had extremely field independent scores on the RFT, and both were significantly more field dependent on the eighth week testing. The other three patients were markedly field dependent on the first RFT, but none of these patients was in the hospital to be tested during the eighth week. The patients, and their diagnoses, are listed in Table 15.

Table 15. RFT Scores of Paranoid Patients

Diagnosis	Age	Sex	RFT_1	RFT_8
Paranoid Schizophrenia	26	Male	0.7	3.4
Chronic Schizophrenia	61	Female	17.5	---
Acute Undiff. Schiz.	16	Female	1.8	4.2
Paranoid Schizophrenia	27	Female	16.7	---
Paranoid Schizophrenia	35	Female	17.0	---

DISCUSSION

The first issue to be resolved is the extent to which the test results for the patient sample are comparable to test results in normals. The patient group showed a wide distribution of scores along the continuum from extreme field dependence to extreme field independence. This is in agreement with Witkin's studies (19,20) which have shown that field dependence scores are distributed continuously in normal populations.

Another point of agreement with previously published studies is the finding that males were more field independent than females. This was true for both schizophrenic and nonschizophrenic groups. Also consistent with the findings of other workers was the positive correlation between increasing age and increasing field dependence. This correlation was significant for both patient groups and, like the correlation with sex, was found on both EFT and RFT measures.

Finally, the high degree of correlation between the EFT and RFT results, in both men and women, and in both diagnostic groups, not only is consistent with previously published findings in normal subjects, but also supports the idea of a construct of perceptual style.

Witkin (20) has shown a direct correlation between intelligence, as measured by the Wechsler Adult Intelli-

gence Scale, and field independece in normal subjects. Taken as a group, our subjects also showed a correlation between field independence and intelligence (as measured by the information scale of the WAIS) on both the EFT and RFT, although this was not statistically significant for the latter. When the nonschizophrenic patients were considered alone, although there was virtually no association between intelligence and field dependence as measured by the RFT, there was a nonsignificant trend of association between intelligence and field dependence as measured by the EFT. The schizophrenic patients, on the other hand, showed significant correlations between these two factors as measured on both tests. This discrepancy between the two diagnostic groups might be interpreted to suggest that while disordered intellectual functioning in schizophrenics is associated with disordered perceptual functioning, a parallel disruption in these two modes does not occur in nonschizophrenic patients. To the extent that tests of verbal intelligence require the ability to selectively attend to certain stimuli (the questions) and to select certain appropriate responses (the correct answers) from memory, this association between intelligence and field independence is consistent with Silverman's attention model. In the nonschizophrenic population, whatever is disturbing perceptual functioning is not as directly influencing in-

tellectual functioning, and so may not be related to selectivity of attention.

Other evidence that there may be a different mechanism of disturbance of perceptual functioning in schizophrenic and nonschizophrenic patients is provided by the correlation between the RFT results from the first week (RFT_1) and the RFT results from the eighth week (RFT_8). The correlation between these two measures was statistically significant for both diagnostic groups, indicating some stability of this perceptual phenomenon even during a period of acute psychological disturbance. However, the correlation for the nonschizophrenic group was significantly lower than that for the schizophrenic group. This is, over the two month interim, the schizophrenics were more stable on this measure than was the nonschizophrenic group.

The nature of the lability of perceptual style in the nonschizophrenic patients is suggested by examination of the manner in which RFT scores changed. The first method of comparing RFT_1 scores with RFT_8 scores, the average of the ratio RFT_8/RFT_1 calculated for each individual, was unsatisfactory for two reasons. First, it does not give information about the absolute magnitude of change, and, second, changes at the field independent end of the continuum will have greater weight than equal changes at the field dependent end of the continuum.

The second method of comparison, utilizing the mean scores for the two diagnostic groups at the two time periods does give a more accurate estimate of the relative field dependence of the two groups, but does not express the degree of variability within the groups.

The third method of comparison, involving the separation within each diagnostic group, of subjects who became more field dependent from those who became more field independent, allows not only the estimation of the trend to change for the diagnostic group as a whole, but also shows patterns of change within the groups. On the basis of this method of comparison, it can be seen that within the schiziphrenic group there is no consistent tendency for either increased or decreased field dependence over time. That is, approximately equal numbers of patients in the schizophrenic group change in each direction, and there was no marked association between direction of change and sub-group (borderline or nonborderline). In the nonschizophrenic group, on the other hand, not only do the majority of patients become for field independent, but they also have a relatively large numerical change. That is, over two moths of hospitalization, the nonschizophrenic patients exhibit a marked change in perceptual style, from initial field dependence to field independence. Although it is possible to invoke the older age of the nonschizophrenic group as the

explanation for the initial field dependence relative to the younger schizophrenic group, this factor would not account for the change over time. The possibility of task learning would be consistent with the improvement in scores, but task learning has been shown in normals not to occur to a significant degree on the RFT. What is perhaps more likely is that the psychiatric difficulties present in the nonschizophrenic group, although these were quite heterogeneous, tend to disrupt perceptual functioning. With the amelioration of symptomology over two months of hospitalization, perceptual functioning was restored to a higher level, and the group as a whole became more field independent. Although it is not possible to associate initial field dependence, or change in field dependence, with any particular diagnosis within the nonschizophrenic group, it is clear that this group as a whole showed a different pattern than that exhibited by the schizophrenic group.

Another area of difference between the schizophrenic and nonschizophrenic patients was the performance on the two tests, EFT and RFT. Although the schizophrenic patients were initially field independent on the RFT, their scores on the EFT, which also was given during the first week of hsopitalization, were more field dependent than those of the nonschizophrenic patients. This field dependence, relative to the nonschizophrenic group, is more

meaningful when the younger age of the schizophrenic group is considered. Thus it appears likely that some aspect of the task of the EFT is responsible for the field dependent performance of the schizophrenic patients. While the RFT as administered in this study involves some degree of motor coordination, it represents a fairly simple perceptual task. The EFT, on the other hand, is quite complex, in that it requires memory of the hidden figure as well as the ability to suppress the background of the complex figure. In addition, the successful subject will be able to avoid overreacting to the frustration which is a hallmark of the test. Thus the ability to attend to the task despite frustration, as well as to remember the specific figure desired, are required for accurate performance on this test. A large body of evidence indicating the existence of a disturbance of cognition or thinking in schizophrenics would support the conclusion that the more complex nature of the EFT makes it relatively more difficult than the RFT for the schizophrenic patients. The present results would give some support to a conclusion that the clinical state of acute schizophrenia is not associated with any change in basic perceptual functioning. There is, however, a disruption in the ability to do tasks which require the sustained integration of perceptual and intellectual skills.

SUMMARY

Seventy psychiatric patients, thirty-four of whom were schizophrenic, were administered Witkin's rod and frame test of field dependence within the first ten days of hospitalization. Forty-nine of the patients were also tested with a short form of Witkin's embedded figures test. The rod and frame test was re-administered to the forty-six patients who were still in the hospital at the end of two months.

The results suggested a slight trend for the schizophrenic patients to be initially more field independent than the nonschizophrenic patients on the rod and frame test. In the patient group as a whole, younger patients, male patients, and more intelligent patients were all more field independent, which is consistent with previous studies. The scores for the patient sample were relatively stable over time. However, at the second testing, the nonschizophrenic patients as a group became markedly less field dependent, whereas there was virtually no change in the mean score for the schizophrenic group. Analysis of individual change yielded no correlations between field dependence and such dichotomies as acute/chronic, process/reactive, or paranoid/nonparanoid. A discrepancy in the field dependence scores derived from the two tests suggested impairment of sustained concentrating ability in the schizophrenic group.

BIBLIOGRAPHY

1. Hoffer, A.; and Osmond, H.: A Perceptual Hypothesis of Schizophrenia, Psychiatry Digest 28:47, 1967.
2. Hoffer, A.; and Osmond, H.: People are Watching Me, Psychiatric Quarterly 37:7-18, 1963.
3. McGhie, A.; and Chapman, J.: Disorders of Attention and Perception in Early Schizophrenia, British Journal of Medical Psychology 34:103-116, 1961.
4. Chapman, J.; and McGhie, A.: A Comparative Study of Disordered Attention in Schizophrenia, Journal of Mental Science 108:487-500, 1962.
5. McGhie, A.; Chapman, J.; and Lawson, S.: The Effect of Distraction on Schizophrenic Performance: (1) Perception and Immediate Memory, British Journal of Psychiatry 111:383-390, 1965.
6. Tucker, G.; Harrow, M.; Detre, T.; and Hoffman, B.: Perceptual Experiences in Schizophrenic and Nonschizophrenic Patients, Archives of General Psychiatry 20: 159-166, 1969.
7. Weckowicz, T.: Size Constancy in Schizophrenic Patients, Journal of Mental Science 103:432, 1957.
8. Weckowicz, T.; and Blewett, D.: Size Constancy and Abstract Thinking in Schizophrenic Patients, Journal of Mental Science 105:909-934, 1959.

9. Weckowicz, T.; Sommer, R.; and Hall, R.: Distance Constancy in Schizophrenic Patients, Journal of Mental Science 104:1174-1182, 1958.

10. Stannard, R.; Singer, G.; and Over, R.: The Effect of Informational Feedback on Size Judgments of Schizophrenic Patients, British Journal of Psychology 57: 329-333, 1966.

11. Bemporad, J.: Perceptual Disorders in Schizophrenia, American Journal of Psychiatry 123:971-976, 1967.

12. Snyder, S.: Perceptual Closure in Acute Paranoid Schizophrenics, Archives of General Psychiatry (Chicago) 5:406-410, 1961.

13. Silverman, J.: The Problem of Attention in Research and Theory in Schizophrenia, Psychological Review 71: 352-379, 1964.

14. Silverman, J.: Perceptual Control of Stimulus Intensity in Paranoid and Nonpapanoid Schizophrenia, Journal of Nervous and Mental Disease 139:545-549, 1964.

15. Silverman, J.: Variations in Cognitive Control and Psychophysiological Defense in the Schizophrenias, Psychosomatic Medicine 29:225-251, 1967.

16. Silverman, J.: A Paradigm for the Study of Altered States of Consciousness, British Journal of Psychiatry 114:1201-1218, 1968.

17. Piaget, J.: *The Psychology of Intelligence*, London: Routledge and Kegan Paul, 1950.

18. Petrie, A.: *Individuality in Pain and Suffering*, Chicago, University of Chicago Press, 1967.

19. Witkin, H.; Lewis, H.; Hertzman, M.; Machoever, K.; Meissner, P; and Wapner, S.: *Personality Through Perception: An Experimental and Clinical Study*, New York: Harper and Brothers, 1954.

20. Witkin, H.; Dyk, R.; Faterson, H.; Goodenough, D.; and Karp, S.: *Psychological Differentiation*, New York: Wiley, 1962.

21. Witkin, H.: Psychological Differentiation and Forms of Pathology, *Journal of Abnormal Psychology* 70: 317-336, 1965.

22. Schwartz, D.; and Karp, S.: Field Dependence in a Geriatric Population, *Perceptual Motor Skills* 24: 495-504, 1967.

23. Karp, S.: Field Dependence and Occupational Activity in the Aged, *Perceptual Motor Skills*,24:603-609, 1967.

24. Karp, S.; Witkin, H.; and Goodenough, D.: Alcoholism and Psychological Differentiation: Effect of Alcohol on Field Dependence, *Journal of Abnormal Psychology* 70:262-265, 1965.

25. Karp, S.; Witkin, H.; and Goodenough, D.: Alcoholism and Psychological Differentiation: Effect of Achieve-

ment of Sobriety on Field Dependence, _Quarterly Journal of Studies on Alcohol_ 26:580-585, 1965.

26. Jacobson, G.: Effect of Brief Sensory Deprivation on Field Dependence, _Journal of Abnormal Psychology_ 71:115-118, 1966.

27. Jacobson, G.: Reduction of Field Dependence in Chronid Alcoholic Patients, _Journal of Abnormal Psychology_ 73: 547-549, 1968.

28. Sugarman, A.; and Cancro, R.: Field Independence and Outcome in Schizophrenia: A U-shaped Relationship, _Perceptual Motor Skills_ 27:1007-1013, 1968.

29. Weckowicz, T.: Perception of Hidden Pictures by Schizophrenic Patients, _Archives of General Psychiatry_ 2: 521-527, 1960.

30. Sugarman, A.; and Cancro, R.: Field Dependence and Sophistication of Body Concept in Schizophrenics, _Journal of Nervous and Mental Disease_ 138:119-123, 1964.

31. Detre, T.; Kessler, D.; and Jarecki, H.: The Role of The General Hospital in Modern Community Psychiatry, _American Journal of Orthopsychiatry_ 33:690-700, 1963.

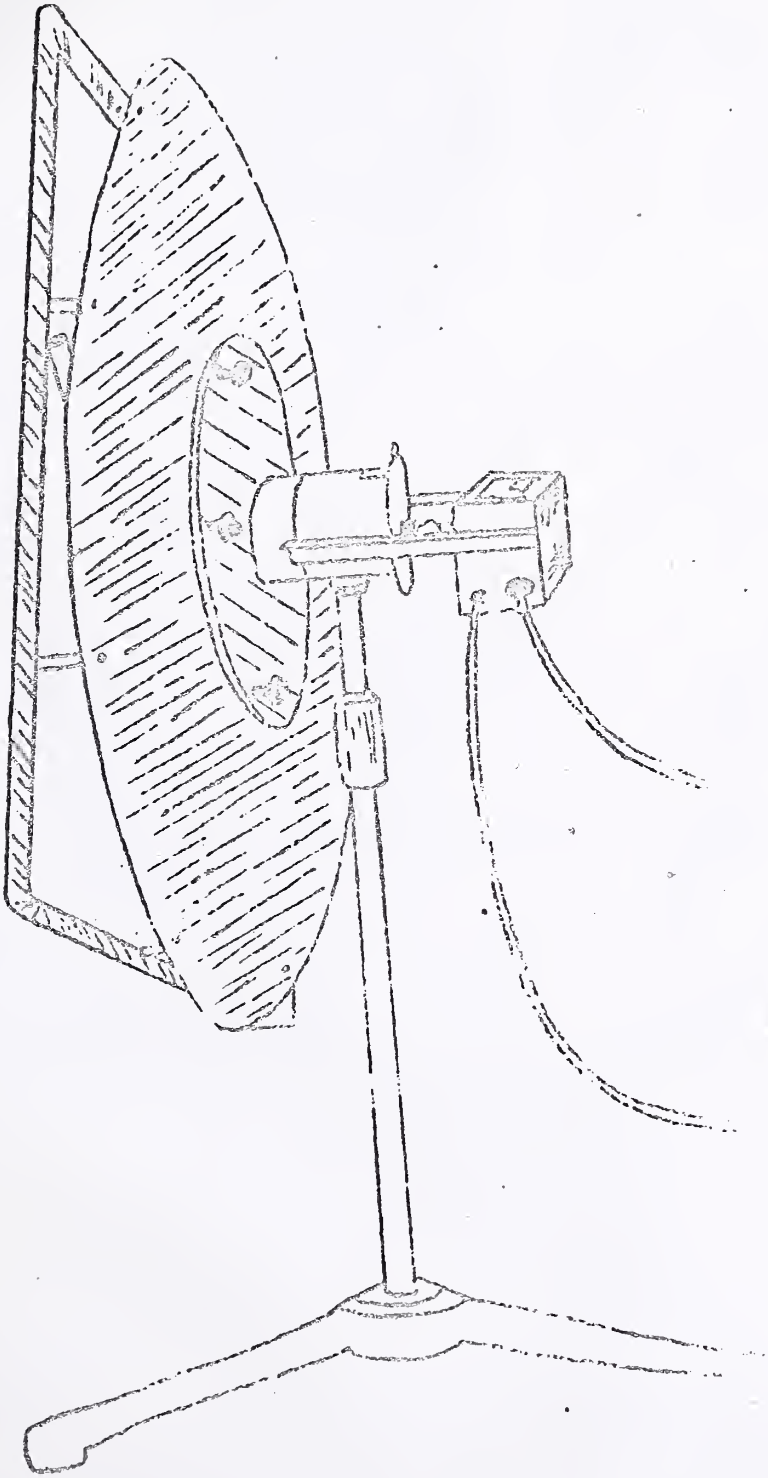
32. Astrachan, B.; Harrow, M.; and Flynn, H.: Influence of the Value-System of a Psychiatric Setting on Behavior in Group Therapy Meetings, _Social Psychiatry_ 3: 165-172, 1968.

33. Jackson, D.: A Short Form of Witkin's Embedded Figures Test, _Journal of Abnormal and Social Psychology_ 53: 254-255, 1956.

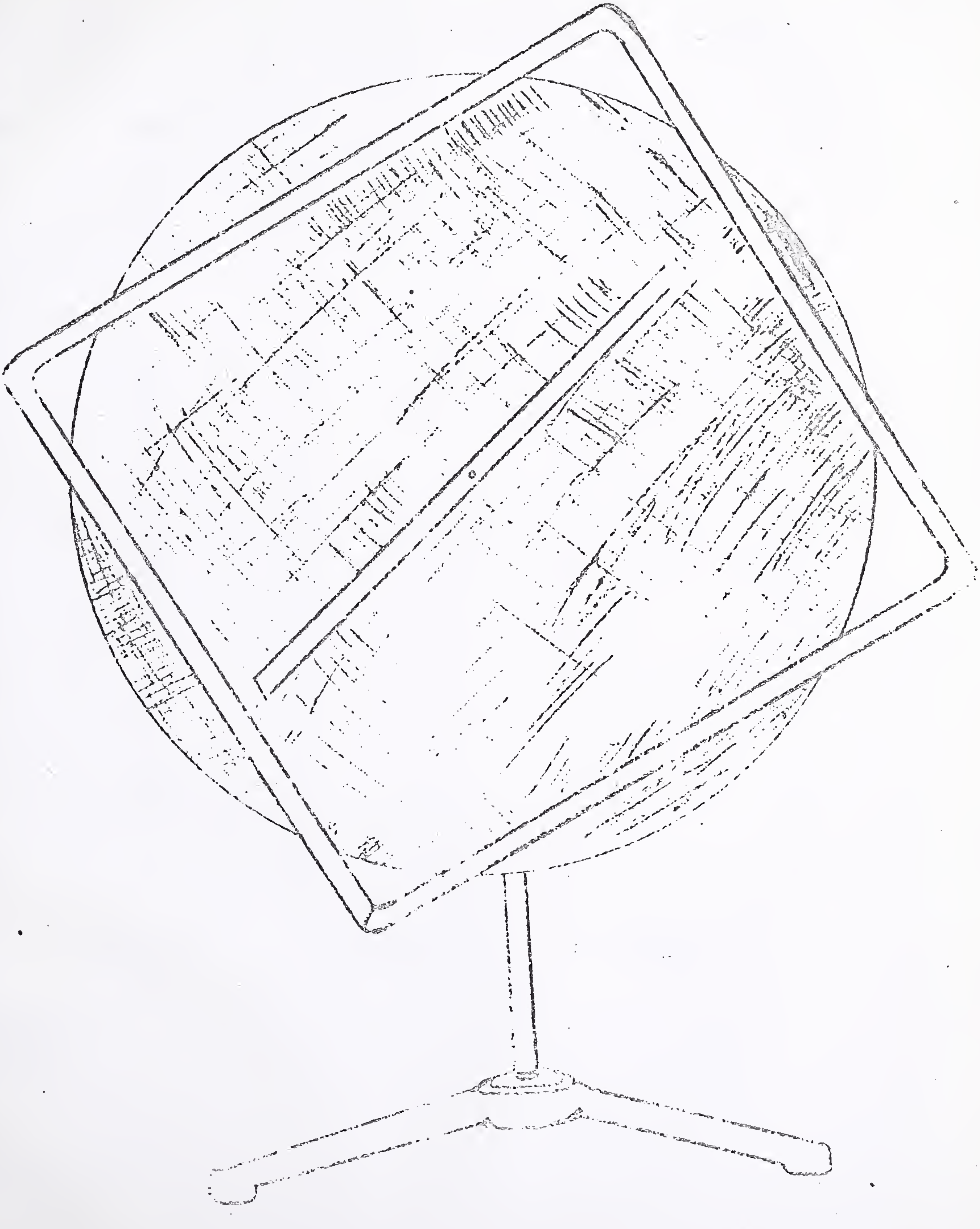
34. Thornton, C.; and Barrett, G.: Methodological Note on N Achievement and Field Independence Comparisons, _Journal of Consulting Psychology_ 31:631-632, 1967.

APPENDIX I. Two Views of the Rod and Frame Apparatus

APPENDIX II. Scoring Sheet with List of Rod and Frame Trials



ROD AND FRAME DEVICE #18 10



Name ______________________ Date __________ Admitted __________

Trial	Frame	Rod	Time	Rod Results	Error
1	330	345			
2	350	05			
3	0	0			
4	0	15			
5	330	315			
6	10	25			
7	10	355			
8	350	350			
9	330	330			
10	30	30			
11	0	345			
12	350	335			
13	10	10			
14	30	15			
15	30	45			

	Not at All		Moderate		Very Much
	1	2	3	4	5
Disorganized					
Anxious					

Current Drugs:

nd
e

;

-
-

Date Due

[illegible] SEP 2 [illegible]